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## THE SIRENIA.

BY ARTHUR E. BROWN.

AS the name of this curious order of aquatic mammals was suggested, without doubt, by the probability that they, in great measure, gave origin to the ancient myths regarding the existence of sirens or mermaids, it may not be inappropriate to take a first look at the animal as it appeared to a sailor of Capt. Weddell's Expedition towards the South Pole, about the close of the first quarter of the present century. "The sailor had lain down and about ten o'clock he heard a noise resembling human cries; and as daylight in these latitudes never disappears at this season, he rose and looked round, but on seeing no person he returned to bed; presently he heard the noise again, rose a second time, but still saw nothing. Conceiving, however, the possibility of a boat being upset, and that some of the crew might be clinging to some detached rocks, he walked along the beach a few steps and heard the noise more distinctly, but in a musical strain. Upon searching round he saw an object lying on a rock a dozen yards from the shore at which he was somewhat frightened. The face and shoulders appeared of human form and of a reddish color; over the shoulders hung long green hair; the tail resembled that of the seal, but the extremities of the arms he could not see distinctly. The creature continued to make a musical noise while he gazed about two minutes, and on perceiving him it disappeared in an instant."

Notwithstanding the fact that the sailor testified his belief in his story by making a cross in the sand and kissing it, we who look on the manatee and dugong, with minds cleared from a delusive belief in mermaids and mermen, are tempted to agree with Capt. Weddell in the last clause of which he makes use in relating the circumstance: "I concluded he must really have seen the animal he described, or that it must have been the effects of a disturbed imagination."

Naturalists, however, have had almost as much trouble, in times past, to determine where these animals structurally belong, as the old explorers had to decide whether they were forms of earthly or supernatural origin. They were classed in the old order *Pachydermata* on account of their points of resemblance to the elephant; then they were put with the whale and the porpoise in

the *Cetacea*, and they are now generally regarded as an independent order, known as *Sirenia*, allied more closely with the Ungulates than with any other living mammals; they—the vegetable eaters of the sea—being doubtless descended from some form of terrestrial Herbivora, as the Seals, Whales, etc.,—the aquatic Carnivores—probably claim parentage among the terrestrial Carnivora.

The earliest Sirenian known to Palæontology is the *Halitherium*, found in the Miocene formation of Central and Southern Europe. Those now existing are separated into two genera,—*Manatus* and *Halicore*, and, generally speaking, there is a strong resemblance between all members of the group.

They all possess a cylindrical body tapering towards each end from a point just in advance of the middle; the tail is flat and horizontal; the hind limbs are entirely wanting; the fore limbs are placed far forward on the breast and are covered with integument like the rest of the body; the nipples are two in number, and, as in the human species, are situated on the breast; the neck is thick and is not separated by a well drawn line of demarcation from either the head or the body; the head is rather small and round, the lips being thick and fleshy; the eyes are round and of small size and the nostrils, situated on top of the extreme end of the snout, are closed with a valve; the presence of an ear is only to be recognized by a sort of crease in the skin; the hide, in appearance and toughness, much resembles galvanized rubber and is covered very scantily with stiff bristles an inch or two long, these are so sparsely scattered, however, that it requires a close inspection, almost, to see that they are there,—around the lips and mouth they are longer and more plenty and are deserving almost of the name of whiskers. In these characters all the Sirenians agree.

The two genera composing the order are, however, recognizable at a glance, and the species into which they are divided, though closely allied, yet present characters which are held to be sufficiently distinctive for the recognition of two species of dugong and three of manatee.

The one genus, *Manatus*, is found altogether in the waters of the Atlantic Ocean, with the single exception of a small part of the East coast of Africa, north of the Cape of Good Hope, while the other genus, *Halicore*, is strictly confined to the South Pacific and Indian Oceans. No species are found in the Northern

Hemisphere much beyond lat.  $30^{\circ}$ , and they are common in the greatest numbers in the equatorial and warmer temperate zones.

*Manatus latirostris* is found in San Domingo and other parts of the West Indian Islands, on the Atlantic coast of Florida and sparingly along the Gulf of Mexico, down to the neighborhood of Honduras, where it gradually merges into *Manatus australis*, which follows the northern and eastern coast of South America to lower Brazil, reaching not much beyond the 20th degree of south latitude.

Crossing the South Atlantic, *Manatus senegalensis* is first found on the western coast of Africa, about the upper part of Senegambia, from which point it ranges southward along the Atlantic coast, around the Cape of Good Hope and up the east coast as far as the Mozambique Channel. Here the first representative of the dugongs, *Halicore dugong*, makes its appearance, about where the last species ends, and ranges up the east coast of Africa, along both shores of the Red Sea and the southern coast of Asia as far as Cochin China; taking in Borneo and the leading islands of the Indian Archipelago lying to the westward of the Straits of Lombok, which marks strictly the boundary line between the Indian fauna and that of the Australian region. The one remaining species, *Halicore australis*, ranges along the northern shore of Australia and down the eastern coast of that continent, which is washed by the waters of the South Pacific, to about latitude  $30^{\circ}$  south. It was stated by Hernandez that he had found an animal supposed to be either *H. dugong* or *H. australis* on the coast of Peru and Ecuador. Individual members of the order have also been seen on several occasions in the neighborhood of the British Islands; it is probable that these belonged to *M. latirostris* and that they were transported by the Gulf Stream from Florida or the West Indies. It is thus seen that the polar extremes in range of the Sirenia are about the  $30^{\circ}$  of latitude, north, in the United States, and the  $35^{\circ}$ , south, at the Cape of Good Hope.

They live generally about the mouths of rivers and are even found up the streams to a considerable distance from the coast, rarely being common in water of more than several fathoms depth. It is stated also that in Africa they inhabit fresh water lakes near the coast,—this is not, however, beyond dispute and is doubtful, except by supposing a water communication with the main sea. All are strictly herbivorous, feeding on the water plants which grow in great profusion in the localities which they frequent.

The manatee rarely attains a length of more than eight to ten feet. The tail, like that of the dugong, is horizontally placed, but differs from that species in being evenly rounded on the end; the fore extremities are short and weak; the fingers are enclosed together in one fold of integument and bear faint vestiges of nails; the skin is thick and very tough and of a lead or slate color. There are no incisor or canine teeth in the adult, and the molars are thirty-eight in number,—twenty in the upper and eighteen in the lower jaw. These are not all present, however, at any one time, as they successively come out, fill their purpose and are succeeded by others in turn. The bones of all the Sirenians are massive and heavy; the animals, therefore, possess little buoyancy in their native element and are not much disposed to rapid motion.

The main points of difference between *M. australis* and *M. senegalensis*, according to Prof. Owen, are in the larger skull of the former and in the conformation of the malar bone and of the mandible or lower jaw. *M. latirostris* is said to resemble the African form more closely than it does its nearer neighbor on the American coast.

Several efforts have been made to keep the manatee alive in confinement, but without much success. One of the most satisfactory attempts was made in the summer of 1876, by the Zoölogical Society of Philadelphia, and as the habits of the animal are not very widely known, a few words descriptive of the manner in which this specimen passed its time may not be uninteresting.

The animal was a female, not fully adult, about six feet long, and was captured in the Orinoko river. She was put in a tank containing about a foot of water and was shipped from Demerara in May, arriving in Philadelphia on the 15th of June, apparently uninjured by the tossing to which the vessel had been subjected during the voyage. She was at once placed in a glass tank containing about forty-five hundred gallons of water, at a temperature of about 75 degrees,—the weather being warm, this was about the natural degree, and only once while the animal lived was it necessary to heat the water artificially to keep it at this point.

The great difficulty was to get it to feed. The ship captain who brought it up, said, "Oh! there is no trouble about that, it will eat anything," and insisted that he had been feeding it on ship-biscuit and cabbage, but when this was tried, the ship-biscuit

might as well have been cobblestones and the cabbage had about as much effect as a piece of rag carpet, so it was tempted with all the delicacies of the season in the way of vegetables, in the hope that something more easy to obtain than river grass might prove acceptable, but nothing would do, so a variety of sea-weed and aquatic plants were placed at its disposal: sedge grass, *Myriophyllum* and *Sagittaria* were to be had in large quantities, but did not seem to be exactly the thing, until at last a variety of *Potamogeton* was found which the animal took to at once and in a month it had eaten all there was in the Schuylkill and Delaware rivers within reaching distance of Philadelphia, and it became necessary to give it something else—generally *Sagittarias*, of which it ate the heads—while a new crop was growing up. It was remarkable to see with what dexterity the animal, though seemingly deficient in all the senses, would pick out the stalks of its favorite food from among a wheelbarrow load of stuff thrown into the tank. In this it appeared to me to be guided more by its sense of smell than by sight,—which agrees perfectly with the observations of Dr. H. C. Chapman, Prosector of the Society, on two specimens which had previously been kept in the garden, and also with the result of his dissection of those animals, which showed that the olfactory nerves were well developed.

The manner of introducing food into the mouth appeared to be peculiar; the upper lip being chiefly used, and that by a motion rather lateral than downwards. The lip is fleshy and tumid, incapable of much mobility and is cleft in the centre, like a hare lip, and the motion seemed to be produced by muscular contractions, drawing the sides inward and toward the cleft, bringing into play the bristles with which they are clothed, almost as organs of prehension.

It was difficult to observe this action, as the animal seemed to be somewhat nocturnal and fed at night; the water also became discolored by the mud which adhered to the plants, and the animal, when feeding, quickly became obscured to view.

It had been stated that the manatee was in the habit of crawling partly out on the bank for the purpose of obtaining food; as it did not seem probable that the animal could move to any extent on land, considering the weakness of its fore-limbs, this was tested in the following manner: A shelf was arranged gently sloping at an angle of about 30° from one side of the tank so that its

lower edge was under water, this was covered with wisps of straw so as to bear some resemblance to the sloping bank of a stream covered with sea-weed left by the ebbing tide. As the animal did not seem disposed to put even its nose on the shelf, its food was for some nights deposited there, just above the water line, with the result that it did not show the slightest disposition to help itself, until after some hours the grass was thrown into the tank, when it at once fed. It never manifested the least trace of a desire to raise itself out of the water, and certainly no structure could be worse adapted to move on land than the awkward bulky body and the weak flippers of the manatee.

The animal was never in good condition from the earliest period of its confinement, and was very apt to become costive, which was always relieved by throwing some soft river mud into the tank, which it swallowed with excellent effect. It appeared to be very fond of mud, and was always more lively when the water was discolored by heavy rains than at any other time. In general, through the day time it rested on the bottom of the tank, on its chin and the end of its tail, with the body slightly arched. Every two and a half minutes on an average, using its tail as a pivot, it raised its head to the surface by the action of its fore flippers, just so that its nostrils appeared above the water, and after taking breath sank at once to its former position at the bottom. Although sluggish and inactive in habit, the animal was not devoid of intelligence; it learned to recognize its keeper, and soon appeared to understand that no harm was intended when the water was drawn off from the tank for the purpose of cleaning. At such times, after the first few days, it lay perfectly quiet on its side, and allowed the keeper to sweep around and over it without making the least disturbance.

The animal lived a quiet unruffled existence, apparently as happy in its tank in a corner of the Carnivora House as it could have been in its natural home. Everything was done for it that it apparently could desire—a palace of glass kept clean without the least trouble to itself, clean water made brackish as that of its native haunts by a solution of marine salt, and carefully watched by the aid of a thermometer lest the cold air of the north should be too trying for a constitution accustomed to the warmth of the equator; plenty of that food which it selected as being best adapted to its wants, and in fact all that the most assiduous care

could suggest and procure, but liberty is liberty, and the waters of the Schuylkill were not those of its native Orinoko, and so after two days of extreme torpor and indisposition to eat, she was found on the morning of September 5th, resting on the bottom of the tank, having died as she had lived, peacefully, and with no more exertion than could by any possibility be avoided.

A careful post mortem examination revealed the presence of a large quantity of a fatty deposit about the region of the heart, exactly as had been the case in two specimens which had previously been kept in the Garden, and as it does not seem possible that accommodations more in accord with the native surroundings of the animal could be given in confinement and in so different a climate, or that the attempt could be made at a more favorable season of the year, it appears almost certain that the speedy death of these animals was owing to insuperable obstacles in the way of acclimating the species here. It is possible that the more northern member of the group, *M. latirostris*, which occasionally experiences a touch of frost in the St. Augustine river in Florida, and is presumably more hardy than those from more southern regions, might be better adapted to a residence in this latitude, but I do not know that the opportunity has ever been fully presented for the experiment. A pair of this species was at the Garden for some days in the month of August, 1876, but as the Society did not care to pay the large price demanded for them, they were removed by their owner to one of the Centennial side shows, where they were destroyed by a fire before they had been here long enough to give any indications as to how they were going to adapt themselves to the climate.

The dugongs grow to a larger size than the manatees, *Halicore dugong* being sometimes twenty feet long; their general appearance is similar, the tail, however, instead of being rounded is forked, and their color is bluish on the back, running into dirty white beneath. The alveolar process of the pre-maxillary bone is much elongated and bent downwards, giving the animal the appearance of having a nose of a very pronounced Roman type, and causing the mouth to open rather downwards.

There are two incisor teeth in the upper jaw of the adult male, and none in the lower jaw; in the female there are no incisors visible, their growth being arrested before they emerge from the socket. The number of molars varies in different individuals

according to age; it is stated that the full number in the adult dentition of *H. australis* is twenty-four, and twenty in *H. dugong*.

The habits of all the sirenians, so far as is known, are essentially similar, the dugong as well as the manatee being found around the mouths and up the water courses of the coast.

This order affords a most striking instance of the discovery and speedy extinction of a species, the *Rhytina borealis*, or *stelleri* of some authors, having been discovered on Behring's island in the sea of Kamschatka, by one of Behring's exploring parties, which was shipwrecked there in 1741. They existed in large numbers, were easily killed, and during the ten months which the shipwrecked party spent on the island, sad havoc was made among the animals. They were rapidly reduced in numbers, and in 1768, twenty-seven years after they became known to civilized man, the last one was killed. Almost all that is known of the living animal is from an account published in 1751, at St. Petersburg, by Steller, who was one of the discovering party, and who saw it in its native haunts.

The *Rhytina* was about twenty-five feet long, had a forked tail like that of the dugong, and was covered with a rough, wrinkled, brownish hide nearly an inch thick, composed of hair-like tubes agglutinated together into a substance somewhat like horn, and of so great toughness that it scarcely yielded to a blow of an axe. The adult animal was entirely devoid of teeth, and had in their stead a rough horny plate on the front of the palate, to which was opposed a similar one on the lower jaw.

The *Sirenia* are of considerable value to the natives of the countries which they inhabit; the hide is of use for making a thick leather, and the flesh is much esteemed for the table. It is said that the church, disagreeing with nature and science, determines that the manatee is a fish, and therefore the good Catholics of South America feast royally on its flesh on Friday and all other fast days.